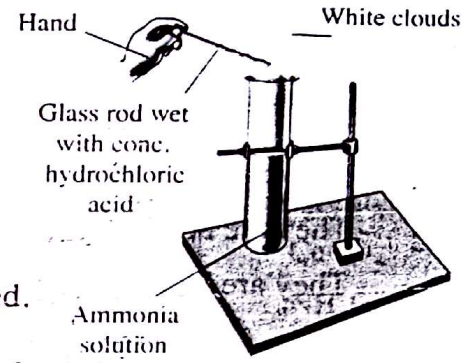
1st prep

Activity 2 To show the combination between ammonia gas (compound) and hydrochloric acid (compound) :

Step :

- Place a glass rod wet with conc. hydrochloric acid (HCl) close to the mouth of a test tube containing ammonia solution.



Observation :

- White clouds of ammonium chloride (NH_4Cl) are formed.

Conclusion :

Ammonia gas (NH_3) [evolves from ammonia solution] combines with hydrochloric acid (HCl) to give ammonium chloride (NH_4Cl) (white clouds).

Ammonia + Hydrochloric acid $\xrightarrow{\text{Conc.}}$ ***Ammonium chloride***

NH_3 (compound) + HCl (compound) $\xrightarrow{\text{Conc.}}$ NH_4Cl (white clouds) (compound)

B. Sulphur oxides :

1 st prep

Such as : a. Sulphur dioxide (SO_2).

(2) b. Sulphur trioxide (SO_3).

- They are acidic gases that cause :

• Respiratory system malfunction (breathing problems).

• Building corrosion.

C. Nitrogen oxides :

- They are acidic gases that are resulted from fuel burning during the time of lightning.
- They are poisonous acidic gases that affect the nervous system and the eye.

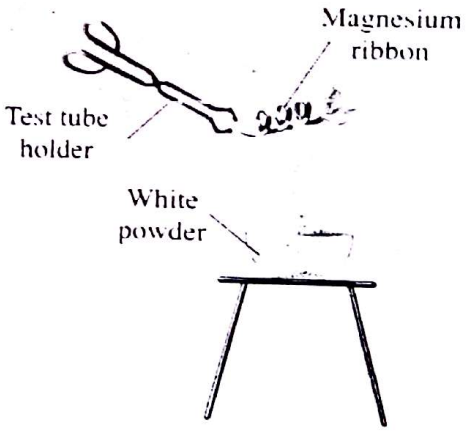
11 Activities :

Activity 1 To understand the concept of chemical reaction :

Steps :

• Hold a piece of magnesium ribbon by a test tube holder.

• Burn the ribbon in air.



Observation :

The solid magnesium ribbon burns and changes from a bendable bright solid into a white powder of a new substance.

Conclusion :

Magnesium reacts with atmospheric oxygen (reactants) to form a new substance which is magnesium oxide (product).

Magnesium + *Oxygen* $\xrightarrow{\Delta}$ *Magnesium oxide*

$2Mg + O_2 \xrightarrow{\Delta} 2MgO$ *(white powder)*

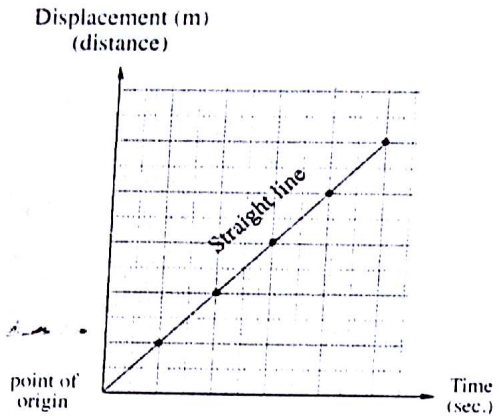
(Reactants) *(Product)*

1 st prep.

Displacement / time graphs :

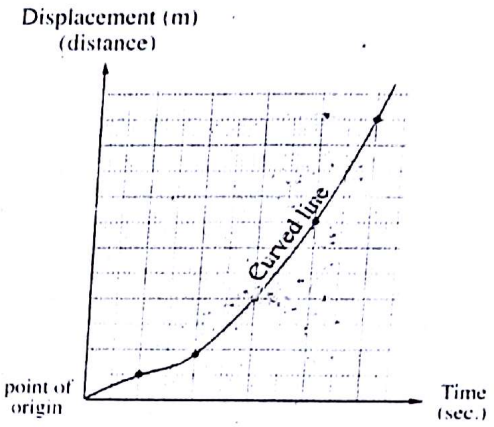
③ *For moving objects :*

(A) objects move with regular speed



The object covers equal displacements every one second in certain direction.

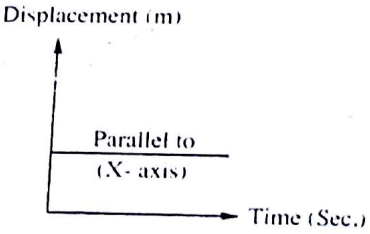
(B) objects move with irregular speed



The object covers unequal displacements every one second in certain direction.

For static objects :

When the displacement value of an object is fixed.



4 Importance and Uses :

Item	Importance/Use.
1. Electromagnet :	**It is used in making of :** • Electric winches which lift scrap iron and cars in ports. • Electric bells.
2. Electric generator (Dynamo) :	It converts the mechanical energy into electric energy.
3. Electric motor :	It converts the electric energy into mechanical energy.
4. Weak nuclear force :	**It is used to get radioactive elements and radiations which are used in :** • Medicine. • Scientific researches. • Industry.
5. Strong nuclear force :	**It is used in :** • Producing electricity. • Military purposes.

1St prep.

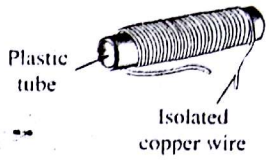
(4)

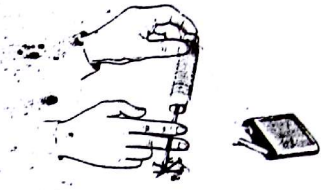
Activity 2

- **To show the magnetic force of electric current.**
- **The idea of how the electromagnet works :**

Procedures :

1. Coil the wire in a spiral form around a plastic tube (as shown in the figure).
2. Insert the iron bar (or the iron nail) in the tube.
3. Connect the two ends of the wire to the battery.
4. Approach the iron core (inside the tube) to the iron filings.





Observation :

The iron bar attracts the iron filings (as it is changed into a magnet).

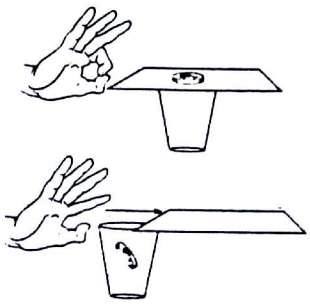
Conclusion :

Electric current has a magnetic effect.

Activity 3 To show that objects resist change of rest state :

Procedures :

1. Place a piece of construction paper on the top of a glass cup and put a coin on it.
2. Use your forefinger to deliver a quick hit to the paper.



Observation :

The paper will go away from the cup, while the coin falls inside the cup.

Explanation:

The paper moves because of your finger's hit, while the coin falls inside the cup because it can't match up with your rapid hit due to its inertia.

Conclusion:

Force of inertia makes objects resist the change of their rest state.

4. Comparison between mechanical waves and electromagnetic waves : 1st prep.

Mechanical waves	Electromagnetic waves
1. They are produced by the vibration of medium particles.	1. They are accompanied by electromagnetic forces.
2. They need a medium to transfer through.	2. They spread in all media and free space.
3. Their speed is relatively low (speed of sound is about 340 m/s). ***Examples :*** • Sound waves. • Water waves.	3. Their speed is very high (speed of light is about 300 millions m/s). ***Examples :*** • Light waves. • X-rays. • Radio waves.

5. Comparison between regular speed and irregular speed :

Regular speed	Irregular speed
1. A speed at which the object moves when it covers equal displacements at equal periods of time.	1. A speed at which the object moves when it covers unequal displacements at equal periods of time.
2. It is represented on displacement - time graph by a straight line passing through point of origin.	2. It is represented on displacement - time graph by a curved line passing through point of origin.

8 Activities :

Activity 1 Earth attracts objects.

Steps :

- Put on the ground a set of objects graded in mass (1 kg. - 5 kg. - 10 kg.)
- Try to lift the masses and put them on a table beginning with the smallest mass then the next one in order.

Observation :

The work done to lift objects increases by increasing the object's mass.

Conclusion:

- Earth attracts the objects to its centre by a force called **"Object's weight"**.
- Object's weight increases by increasing the object's mass and vice versa.

1 st prep

6. Ozone layer :	It protects living organisms from the harmful ultraviolet rays.
7. Water :	- Plants use it in photosynthesis process to form food. - **Man and animal benefit from it in :** • Completing food digestion and absorption processes in the digestive system. • Sharing in blood formation. • Stablizing the body temperature.
8. Gravity	**It makes the life possible through :** - Constancy and steadfastness of objects and living organisms on its surface. - Steadfastness of the hydrosphere position on its surface. - Keeping the Earth surrounded by the atmosphere.
9. Seismograph apparatus :	**It is used in recording :** • The earthquake intensity. • The timing of the earthquake occurrence and its duration.
10. Richter magnitude scale :	It is used for measuring the earthquake intensity.
11. The spring in seismograph apparatus :	It absorbs the seismic shakes.

3 Importance or uses :

Item	Importance (or uses)
1. Telescopes :	They are used in identifying the celestial bodies.
2. Oxygen gas :	- It is used in respiration process of living organisms. - It helps in combustion (burning) process of fuels.
3. Nitrogen gas :	- It reduces the effect of oxygen gas during burning processes. - Plants use it to form proteins.
4. Carbon dioxide gas :	It is used by green plants in photosynthesis process to form food for other living organisms.
5. Earth's atmosphere (concerning the meteors and meteorites) :	**The great expansion of atmosphere in the space helps in :** • Burning millions of small falling meteors completely before reaching the Earth's surface. • Reducing the high speed of large meteorites and burning a part of them before their hitting the Earth's surface.

1 St prep

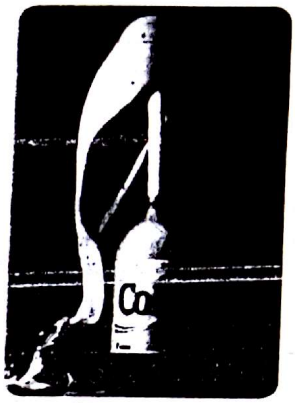
Activity 3

- A volcano of soft drink.
- To show the volcanoes.

(7)

Steps :

- Bring a closed soft drink bottle.
- Shake the bottle, then open it.



Obs. & concl. :

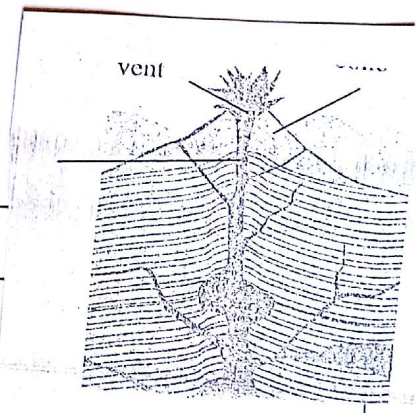
- Rush of the gas with the liquid to outside the bottle making an effervescence.

Explanation :

- On shaking the closed bottle, the trapped gas inside the closed bottle lies under a high pressure.
- On opening the bottle, pressure decreases, so the gas rushes to outside with the liquid making an effervescence.

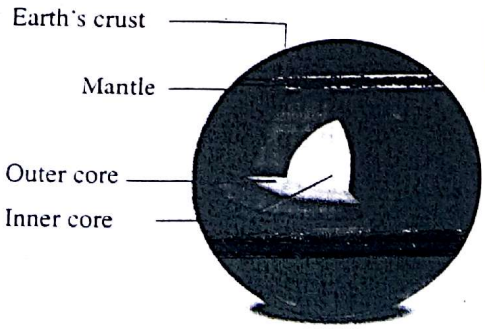
Similarly :

The trapped magma inside the Earth contains gases under high pressure and in the presence of weak parts in the Earth's crust, pressure on the magma decreases, so it is extruded (goes out) to the Earth's surface in the form of volcanic eruption.



9 Important drawings :

1. Earth's layers :



1st prep.

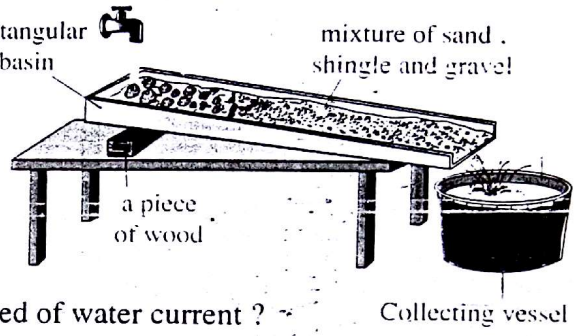
8 Activities :

Activity 1 To show transportation and deposition processes.

(8)

Steps :

- Bring a rectangular basin and place it in an inclined position.
- Put a mixture of sand, shingle and gravel at its upper part.
- Pour water upon this mixture.
- **What do you notice** when increasing the speed of water current ?



Observation :

- Water takes the smooth sand on its way and the sand deposits in the collecting vessel, while shingle and gravel remain in the rectangular basin.
- If the speed of water increases, the size of the transported grains increases.

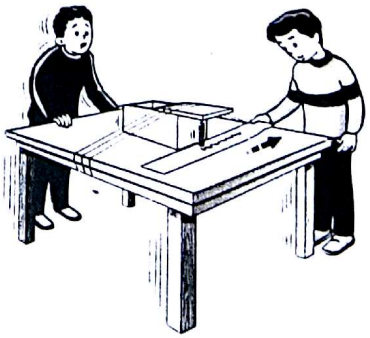
Similarly :

The water currents in seas and rivers transport the fragmented particles of rocks and deposit them above each other in the form of layers.

Activity 2 The idea of how a seismograph works :

Steps :

- Put a paper strip on a table.
- Fix the box well on a table by a cord, then move the cover of the box a little forward.
- Fix the pencil by a plaster in the cover of the box (as shown in the figure), where the pencil tip touches the paper strip.
- Pull the paper strip slowly and at the same time a classmate shakes the table.



Obs. & concl. :

- A zigzag line appears on the paper strip.
- The zigzag increases by increasing shakes of the table.

Unit 3 | Rocks & Minerals | Lesson 3

Rocks

A natural solid material exists in the earth's crust& is formed of a group of minerals.

Types of rocks

1)-Igneous rocks.

2)-Sedimentary rocks.

3)-Metamorphic rocks.

First: Igneous rocks:

1. Formed from the molten matter underneath earth's crust.
2. If the magma is extruded to the surface in the form of volcanic Flows , it is known as lava.

Examples:

1)-Granite. 2)-Basalt.

Second: Sedimentary rocks

They are rocks which are formed from the fragments& decomposed products of other rocks.

The formation of sedimentary rocks: 1st prep.

By 3 steps:

1. Erosion.
2. Transportation.
2. Sedimentation.

Examples

1. Sandstones. 2. Limestone.

Third: Metamorphic rocks:

The rocks which are formed from igneous or sedimentary rocks when they are subjected to high temperature or pressure or both of them.

Example

Such as: Marble.